

PATENT SPECIFICATION (11)

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(54) IMPROVEMENTS IN WEB CUTTING

(71) We, MOLINS LIMITED, a British Company, of 2 Evelyn Street, Deptford, London, SE8 5DH, do hereby declare this invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention is concerned particularly but not exclusively with a cutting apparatus for cutting at regular intervals the web of paper which is used as a uniting band to join tobacco rods to filters to form filter-tipped cigarettes.

In a known arrangement shown basically, for example, in U.S. Patent No. 4,044,779 (and used in the Molins PAS filter attachment machine), the web is fed onto a drum having suction ports whereby the web is pulled forward and whereby the pieces cut from the web are held on the drum. A cutting drum formed with knife edges is arranged to cut the web at regular intervals, for which purpose the suction drum is normally formed with hardened inserts serving as anvil members with which the knives cooperate to cut the web. The suction drum and the knives move at a speed greater than that at which the web is fed towards the drum, so that the cut portions of the web are spaced apart on the suction drum.

In that known arrangement the engagement of the knives with the anvil members is a cause of noise. The present invention is concerned mainly with reducing or eliminating the noise associated with the web cutting.

According to the present invention, apparatus for transversely cutting a web of paper or the like comprises a first drum which supports the web during cutting and has a line of fixed recessed pins arranged to extend across the web in the position of the desired cut, the points of the pins being flush with or slightly below the outer surface of the first drum, and a second drum which has a line of fixed protruding pins which move into engagement with the web

and are arranged to cooperate with the pins on the first member to cut the web.

It should be understood that the pins "cut" the web by forming a row of closely spaced perforations, thus considerably weakening the web along the line of perforations so that the web tears along the line of perforations. In a preferred arrangement the cooperating pins move forward at a speed greater than that of the web so as to pull the leading portion of the web away from the trailing portion.

The first drum which is preferably formed with suction ports preferably supports the web during cutting. The pins on the first drum are preferably recessed, that is to say do not protrude beyond the circumference of the drum so that the web can slip along the drum, prior to cutting, without being torn by the pins.

Examples of apparatus according to this invention will now be described with reference to the accompanying drawings. In these drawings:

Figure 1 is a sectioned perspective view of one form of cutting apparatus according to this invention—including two cutting drums;

Figure 2 is a fragmentary section, on an enlarged scale, in a plane containing the axes of the two cutting drums; and

Figure 3 is a section on the line III—III in Figure 2.

Figure 1 shows part of an apparatus used to connect tobacco rods to filters for forming filter-tipped cigarettes. A fluted delivery drum 10 carries towards a rolling drum 12 a succession of assemblies 14 each consisting of two axially spaced tobacco rods with an interposed double-length filter portion. An adhesive-coated web 16 (e.g. of cork-like appearance) is also fed onto the drum 12, and successive web portions 16A are cut from the web 16 and are spaced apart on the drum 12. For further details of the general arrangement, reference is directed to U.S. Patent No. 4,044,779.

Each web portion 16A arrives with its leading edge in time to meet one assembly

14 as the assembly 14 arrives at the drum 12. A rolling plate 18 cooperates with the drum 12 to roll each assembly 14, thus wrapping the corresponding web portion 16A around the assembly. The web is sufficiently wide to project beyond both ends of the double-length filter portion so as to overlap the adjacent ends of the tobacco rods, thus forming a uniting band which joins the tobacco rods to the filter portion. Double filter tipped cigarettes 20 which are thus formed are received by a further fluted drum 22 and are subsequently cut through the middle to form two rows of individual filter-tipped cigarettes.

The web 16 is fed towards the drum 12 at a controlled speed which is less than the peripheral speed of the drum 12. This is in order to space apart the cut portions 16A of the web. Between cutting operations, the web 16 is held in tension as a result of being gripped by the action of suction applied through suction ports 13 in the surface of the drum 12. The gripping force of the suction is sufficient to maintain the web 16 in tension, but allows the web to slip relative to the drum 12 prior to cutting.

At each cutting position on the drum 12 there is an axially extending groove containing an insert 24 which carries a line of pins 26. Each insert 24 has an outer surface which forms a continuation of the cylindrical surface of the drum, except in the region of a central recess 24A in which the tips of the pins lie. It should be noted that the points of the pins lie slightly below the outer surface of the insert 24 so as to be slightly spaced from the web as it slides along the surface of the drum 12 prior to cutting; the distance by which the points of the pins 26 are recessed is shown slightly exaggerated in Figures 2 and 3.

The inserts 24 are releasably secured in the grooves in the drum 12 by screws 24B, so that the inserts can readily be replaced when necessary.

Each cut in the web 16 is made by cooperation between a line of pins 26 in the drum 12 with a line of protruding pins 28 carried by a drum 30 which has a peripheral speed equal to that of the drum 12. The pins 26 are mounted in inserts 27 which are releasably secured in axial grooves in the drum 30 by screws 27A. The movement of the pins 28 and their spacing along the drum 30 are such that in each set of pins 28 intermeshes closely with a set of pins 26 on the drum 12, as shown in Figure 3. As a result, the web is perforated by both sets of pins so as to be considerably weakened, and the forward pull on the portion of the web downstream of the cutting position (resulting initially from the forward movement of the pins and also from the gripping action of the suction ports in the drum 12)

separates the leading end portion 16A of the web away from the remainder of the web upstream of the cooperating pins.

The pins 26 and 28 do not necessarily have to be as close together as is shown in Figure 3.

It will be understood that the adhesive coating on the web needs to be on the upper surface of the web as it approaches the drum 12. The adhesive may be of a wet kind (e.g. polyvinyl acetate) which subsequently dries, or it may be a hot-melt adhesive; in the latter case the adhesive is preferably non-sticky at the time of cutting on the drum 12, so as not to adhere to the drum, and is subsequently softened by heat (e.g. from a radiant heat source close to the drum 12) so as to be sticky by the time the web portions 16A reach the assemblies 14.

WHAT WE CLAIM IS:—

1. Apparatus for transversely cutting a web of paper or the like, comprising a first drum which supports the web during cutting and has a line of fixed recessed pins arranged to extend across the web in the position of the desired cut, the points of the pins being flush with or slightly below the outer surface of the first drum, and a second drum which has a line of fixed protruding pins which move into engagement with the web and are arranged to cooperate with the pins on the first member to cut the web.

2. Apparatus according to claim 1 in which the first drum is formed with suction ports whereby rotation of the drum tends to pull forward and thereby tension the web.

3. Apparatus according to claim 2 for cutting a web at regular intervals, in which the first drum is arranged to rotate so as to have a peripheral speed greater than the speed at which the web advances towards the drum, so that successive portions cut from the web are spaced apart on the drum.

4. Apparatus according to claim 3 in which the first drum has a number of parallel lines of pins circumferentially spaced around the drum.

5. Apparatus according to any one of claims 2 to 4 in which the second drum is arranged to rotate with a peripheral speed substantially equal to that of the first drum.

6. Apparatus according to any one of claims 1 to 5 in which the pins of the first and second drums are arranged to intermesh during cutting.

7. A machine for making filter-tipped cigarettes by joining tobacco rods to filters by means of uniting bands, including a web cutting apparatus according to any one of claims 1 to 6 for cutting a continuous web of uniting band material at regular intervals.

8. A machine according to claims 5 and 7, in which the first drum serves as a rolling drum around which tobacco-rod/filter assemblies are rolled with the aid of a

rolling plate to wrap uniting bands around successive assemblies to join the tobacco rods to the respective filters.

9. Apparatus according to claim 1 and
5 substantially as described with reference to
the accompanying drawings.

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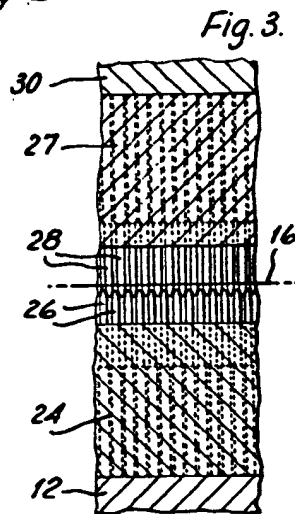
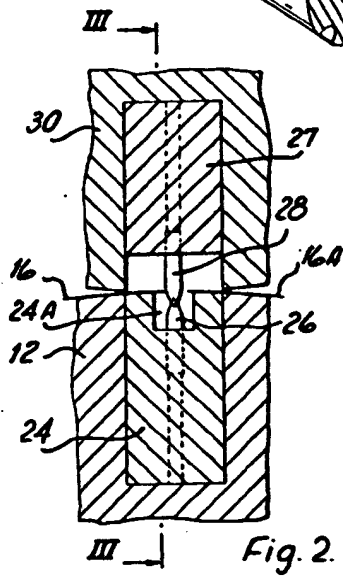
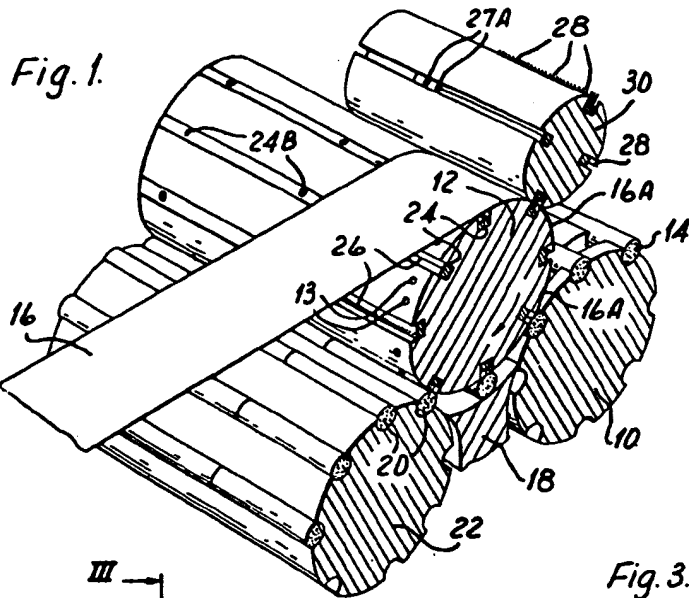
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COMPLETE SPECIFICATION

1 SHEET

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